

CEREALS

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The leading journal for field crops



STAK Annual Congress

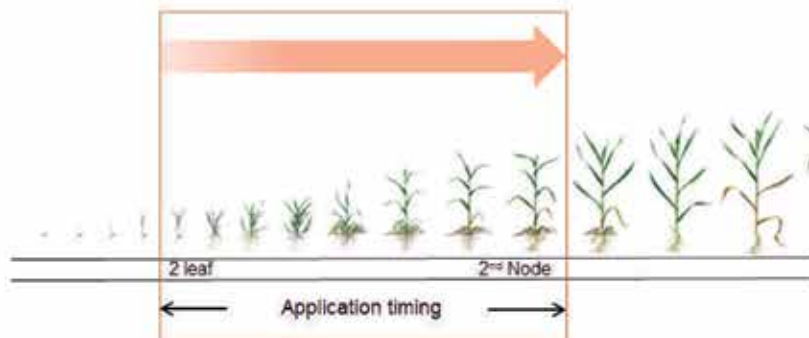
Cereals, Jan - March 2023



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Happy 2023

2023 is a year to have conversations with consumers about their food choices and listen to the reasons they make them.



I put this first because I think it's the hardest, for several reasons. First, we grow the food, so it's hard to talk with consumers and not take what they say personally. Second, often when we should be actively listening, we're busy formulating a response in our minds so we don't truly hear what is being said.


Consumers talk about food because it's important to them and they have connections to it. Don't believe me? Mention bread to anyone in my family and I bet they will talk about how we looked forward to my grandma's skillet chapatti during the holidays.

Consumers ask questions because they don't know how or why food is raised the way it is. They shouldn't, and we need to stop expecting them to inherently understand what we do. If they are asking, it shows interest and we need to take advantage of this opportunity to connect. Food is personal for everyone. Talk with a consumer about their food choices – perhaps one sitting across the table from you.

Last, but not least, make time to spend with your family away from the farm. Go on a trip, even if it's just for the day. Coach your child's ball team, volunteer in their classroom, or meet them for lunch at school. Have a date night with your spouse or significant other. Farming is a wonderful life for our family, but it's good to get away sometimes.

Where is one place your family would enjoy? Pick a spot and resolve to visit it this year.

Masila Kanyingi
Editor




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country.

He said at least 80 farmers across the country were enlisted in the validation of the project to scale up extension services and sure that agronomic practices including the yet new integrated pest control technology was adopted within one year.

Head of Technology Transfer Unit at International Centre of Insect Physiology and Ecology (ICIPE) Saliou Niassy, said the organization had also recommended the use of prey insects to control the spread of the invasive worm by introducing parasitic species that fed on their lava.

“We recommended environmentally friendly solutions including the push pull technology and the intercropping with legumes that also help in preserving moisture due to their undergrowth coverage” he said.

Centre for Agriculture and Bio Science International (CABI) research organization who were also part of the research team has introduced a naturally occurring virus that once extracted and formulated could control the worms.

CABI lead scientist Dancan Chacha said the viral formula was cost effective in the long run because the farmers could use worms that were killed during the initial spraying to develop more pesticides.

Kenneth Kagai, Trans Nzoia county Crops Officer expressed optimism that farmers would prefer to adopt the biological pest control mechanism to cut costs on farm inputs once the resistant varieties of maize were released.

Scientists in Kenya Ally to control the fall army worm

The government has partnered with multinational research organizations to develop an eco-friendly pest management technology to contain the spread of fall army worms in Kenya.

The project which is fronted by the International Maize and Wheat Improvement Centre (CIMMYT), Kenya Agricultural and Livestock Research Organization (KALRO) and ICIPE is on trial phase at Kiboko field station in Makeni County and is expected to be concluded by February 2023.

The Director Global Maize programme at CIMMYT, Dr. Prassana Boddupalli-, said the Integrated Pest Management (IPM) was to encourage farmers in Sub Saharan Africa and Asia where the outbreak of the fall army worm devastated their yields to adopt less toxic and affordable ways of containing the invasive pests.

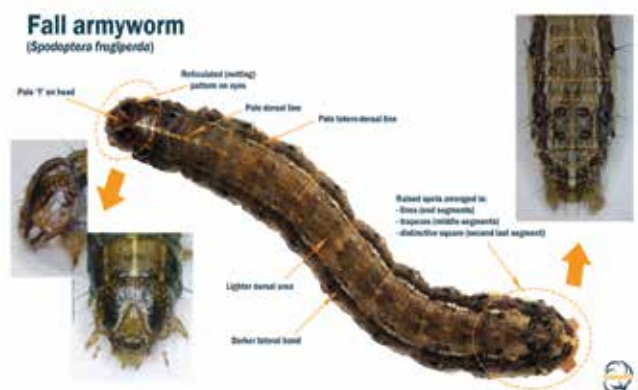
“We want farmers to dissociate from application of synthetic toxic pesticides and chemicals but revert to use of combined approaches like use of resistant varieties, bio pesticides and related biological control

methods that are environmentally friendly” he said.

Boddupalli told farmers during a visit at the research stations where the viability of naturally tolerant varieties of maize from Mexico were being tested that scientists were experimenting the foreign seeds to establish their resistance to tropical pest and diseases.

He said preliminary assessment at the research station indicated that at least two or three of the resistant varieties may be approved once the regulator certified the recommendations from the project.

KALRO lead agricultural Entomologist Paddy Likhayo said since the outbreak of fall worms was reported in the country in 2016 the maize yields dropped by between 30 – 50% further aggravating the already fragile food security in the





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Maize Smut (*Ustilago Maydis*) a Pathogenic Fungus Forming Tumors on Maize

The fungus can survive for long periods of time in the soil or crop residues. Spores are carried by air currents or splashed by water to young, actively growing plant parts. Infection normally takes place through the silks or wounds created by hail, insect feeding or other mechanical injury to any part of the plant.

All aerial parts of the plant are susceptible, particularly young, actively growing or meristematic tissues. Galls may develop on leaves, stalks and tassels, but are probably most common and easily recognizable when they develop on the ear.

Causes

Common smut is caused by the fungus *Ustilago maydis*, which can remain viable in the

soil for several years. Spores spread onto the plants with wind, soil dust and rain splashes. The infection process is favored by the presence of injuries, such as those inflicted by insects, animals, bad cultivation

practices or hail. There is no direct secondary transmission from plant to plant. The symptoms are particularly severe in tissues with a huge growth potential (like ears or growing tips). Weather extremes that result in scanty pollen production

Maize smut is a plant disease caused by the pathogenic fungus *Ustilago maydis* that causes smut on maize. It is most severe when young, actively growing plant tissues are wounded. The

fungus forms galls on maize cobs and is most vigorous in warm weather. The early signs of an attack are whitish galls that later rupture to release dark spores capable of infecting other maize plants.



Smut galls developing on kernels

and poor pollination rates (like a drought followed by heavy rain) are conducive to the propagation of the fungus.

Conditions and timing that favor disease

Common smut is often most severe when young tissue is wounded. Rainy, wet weather may enhance this disease, as may poor pollination and excessive nitrogen fertilization. Dry or other conditions that interfere with pollination may also favor common smut infection of ears.

Symptoms

All actively growing parts of the plant can be infected with the fungus. Their predisposition to injuries and their growth potential makes them prone to show the most dramatic symptoms. Plants in the seedling stage are the most susceptible to infection. In that case, plant growth is stunted and they may not produce inflorescences or ears. On older plants, the infection results in the formation of tumorous growth, a combination of host and fungal tissues. Smut galls are greenish white at their early stages and turn black



Smut infection causes the kernels to swell up into tumor-like galls (Pic: Courtesy)

as they mature. They are particularly characteristic on ears, where each single kernel can develop its own gall. As they rupture, they show a powdery black content. On leaves, the tumorous growth usually remains small and dries out without rupturing.

Management

Fungicides used as seed protectants are listed below. However, it is the responsibility of seed companies to treat seeds, and must not be carried out by a farmer. Pre-treated seeds can be purchased.

- Carboxin 15%+Thiram 13% 1.5 g per kg seed.
- Thiram is a broad-spectrum surface contact fungicide.
- Prothioconazole 2g per kg seed.
- Carbendazim 2g per kg seed.

Restrictions

Carboxin: WHO Class III (Slightly hazardous). **Thiram:** WHO Class II (Moderately hazardous). Do not graze or feed livestock on treated crops for 6 weeks. When using a pesticide always wear protective clothing. Follow the instructions on the product label, such as dosage, timing of application, pre-harvest interval, max number of sprays, restricted re-entry interval. Do not empty into drains. Always consult recent list of registered pesticides by (PCPB).

Organic Control- Direct control of the fungus is difficult and ineffective method



Black streaks appear inside galls as fungal strands develop into spores.

eg. sorghum and finger millet



Monitoring

When plant reaches knee height check weekly for the presence of whitish grey tumor- like galls/ swelling on: tassels, husks, ears/ kernels, stalks, leaves, prop roots. Take action as soon as one infected plant is observed.

Key Notes;

- Plants in the seedling stage show stunted growth and may not produce inflorescences or ears.
- On older plants, the infection results in the formation of galls full of black smut on ears.
- As they rupture, they show a powdery black content.
- On leaves, the tumorous growth usually remains small and dries out without rupturing.

has been developed so far against this pathogenic fungi.

Chemical Control- Seed and foliar applications of fungicides do not reduce the incidence of common smut infections . Always consider an integrated approach with preventive measures together with possible biological treatments.

Direct Control- Cut out and destroy the gall before the smut ruptures. Destroy infected plants by burning or burying away from the farm. Seed dressing is the most effective management option.

Preventive Measures

- Make sure to keep a wide space between plants.
- Monitor, collect and destroy galls before dark fungal spores are released.
- Prevent damage by insects and other pests.
- Avoid to damage the crops during cultivation practices.
- Make sure that tools and equipment are clean.
- Avoid excessive fertilization with

nitrogen.

- Remove all residue after harvest and do not compost infected plant parts.
- Plough deep to bury surviving spores
- Practice crop rotation with non-cereal plants such as cassava and sweet potatoes
- Plant clean and disease-free seeds because the disease is also seed borne
- Plant resistant/ tolerant varieties
- Plant at the onset of the rains for good crop establishment
- Avoid feeding livestock with infected materials because the spores can be transmitted through manure
- Do not use higher rates of manure and nitrogen because disease incidence is higher in soils that contain a lot of nitrogen
- Avoid injuring roots, stems and leaves during ploughing because it creates entry point for disease
- Eliminate volunteer host plant,





In reflecting on the second question, I have come to the conclusion that it is time for the public to put their trust in scientists about the role that genetically improved organisms can play in answering it.

It's sad that Africa continues to lag behind in the adoption of biotech crops 23 years after they were first commercialized. As of 2021, a total of 10 countries in Africa were growing GM crops, according to the International Service for the Acquisition of Agri-biotech Applications. They include South Africa, Burkina Faso, Egypt, Sudan, Mozambique, Niger, Ghana, Rwanda, Zambia, and Nigeria. The delay is especially tragic since there is more than enough evidence that biotech crop adoption could help tremendously in addressing the challenges of hunger and malnutrition globally.

In Africa, it is time we focus on diligent and accelerated regulatory regimes, as well as decisions based on science and the benefits of agricultural biotechnology. It is time we focus on agricultural productivity with an acknowledgement of environmental conservation and sustainability. It is time we give strong consideration to the millions of people who are hungry and impoverished across our continent and how modern agricultural biotechnology can help contribute to

What will I eat today' vs. 'will I eat today?'

It's time to trust African scientists

In the West, on a daily basis, people are asking themselves, "What will I eat today?" But in my home, Kenya and Africa, people daily are asking themselves a more challenging question: "Will I eat today?" Writes Dr. Mwimali Murenga

resolving these food insecurity challenges, instead of focusing on perceived risks and concerns that have never been backed with any evidence. Reluctance to adopt the technology is partly attributed to safety concerns, heightened by strong activism propagated from the west by countries that don't face the same challenges that we do.

Recently, in 2017, a team of scientists from Italy published an analysis detailing the potential impacts of genetically modified (GM) maize on the environment, agriculture and toxicity. The data generated over 20 years concluded that genetic engineering increased maize yields by 10 percent on average and reduced conventional mycotoxins in maize. This multiple data analysis provides very reliable evidence that GM maize can tackle a serious problem that has afflicted the continent for a long time – aflatoxin. Lower levels of natural mycotoxins, which are reported to be both poisonous and carcinogenic to humans and livestock, were observed in GM maize compared to its conventional counterpart. The study, like many before it, endorsed the safety of genetically modified organisms.

In 2016, the US National Academy of Science published a report on GMOs which reinforced the scientific consensus that there is no substantial evidence that GM crops are less safe than non-GM crops. The question that lingers on my mind is this: How many studies will it take for our leaders

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to trust scientists? What is the scientist supposed to do beyond providing evidence that the technology works?

There is evidence, too, that “stacking” several GM traits in one crop is beneficial, resulting in yield increases of over 25 percent. In the same vein, no significant impacts have been observed on non-target organisms and other beneficial organisms, including bees, ladybirds, beetles, lacewings and spiders. In previous data analyses, it has been documented that adoption of GMOs reduces the use chemical pesticides by about 37 percent compared to their conventional counterparts. Why then would our leaders want to get in the way of people enjoying such benefits, long after safety concerns have been put to bed?

Regardless of the scientific consensus and countless studies endorsing the safety of GM crops, there is widespread public perception that they are not safe. Worse still, some African governments have even hampered their production, only to allow imports of food and feed resulting from or containing GM products. This only benefits farmers in countries that have adopted the technology, while indirectly affecting

our research progress, further delaying our access to improved seeds. This is a worrying trend in a continent viewed as the final frontier for agricultural transformation and bringing the massive numbers of unemployed youth into smart farming.

It is disheartening when those entrusted with the responsibility of making key decisions about this continent’s food and nutrition security continue to let half-truths impede them from taking decisive action. They shy away from making evidence-based decisions and developing facilitative policies that can enable this viable

technology to blossom. Approximately two decades after the technology has proved itself both in terms of safety and delivery of socio-economic benefits, some of our leaders continue to hide behind precautionary measures and demand for “never-ending research.”

African leaders need to care about these studies and others that have endorsed the safety of GMOs and let credible scientific evidence guide them in decision making. In Africa, we have many collaborative initiatives on GM crops under various projects in many countries, and others that continue to face regulatory bottlenecks leading to significant lost opportunities for farmers and their families.

The narrative of “what will I eat today?” versus “will I eat today?” cannot continue. It is time African governments take action. We need products in the farmers’ fields and food on the table, and the time is now!

Mwimali Murenga, PhD, is a scientist in Kenya and a 2019 Cornell Alliance for Science Fellow. mwimali@yahoo.co.uk

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STAK Annual Congress and Mazao Forum 2022

Seed Trade Association of Kenya (STAK)-an umbrella body bringing together all the seed processors in the country, recently held a two-day conference at the Kenya Agricultural and Livestock Research

the fourth estate to the 2022 STAK Annual Conference.

Under the theme, “Building resilient agricultural systems for improved livelihood and environmental sustainability,” a myriad

Services (Cropnuts), Consultative Group on International Agricultural Research (CGIAR), National Seed Association of Rwanda (NSAR), Pest Control Products Board(PCPB), Society of Crop Agribusiness Advisors of Kenya (SOCAA) ,) KALRO

among others.

The two days saw free flow of information from different speakers such as Boddupalli.M. Prasanna- Director, Global Maize Program, CIMMYT & CGIAR Plant Health Initiative Lead; who talked on Deploying Climate resilient Maize in Africa elaborating on maize in the Tropics under a subtitle on ‘Food, Feed & Source of Sustenance and Income for Millions.’ Prasanna, said, according to



Organization Headquarters (KALRO) in Loresho, Nairobi.

Not long ago, discussions had been held on the need to advance agriculture innovations and technologies that spark growth in food production as well as environmental preservation. Therefore, as a way to further this agenda, STAK invited stakeholders involved in the seed industry including development partners, processors, government officials, machinery suppliers, research institutions, agrochemicals, agro-dealers, farmers, and members of

of speakers took the podium to educate farmers and stakeholders on pertinent issues affecting the seed value chain and legal frameworks that regulate seeds distribution and usage. Farmers also took the opportunity to air their grievances as well as to ask questions.

Among the presenters for the two-day event were; Advanta Seeds Africa, The International Maize and Wheat Improvement Center (CIMMYT) , Kenyatta University, Kenya Plant Health Inspectorate Service (KEPHIS), Agri Experience, Agrochemicals Association of Kenya(AAK), Crop Life, Crop Nutrition Laboratory

research, 194 million hectares of land worldwide is in the tropics and approximately 70 Million hectares is in the rain fed tropical environments of Africa, Asia and Latin America. Maize in itself is accountable for 15-56% of calories in the sub-saharan Africa, Latin America and Asia. Prasanna said that South Asia and Sub-Saharan Africa are indeed "hot-spots" for climate-induced variabilities and extremes. “There is no magic bullet and thus we need an array of interventions, including improved stress-resilient and nutritionally enriched crop varieties plus sustainable

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intensification practices and enabling policies.” A combination of solutions, along with enabling policies, are required to sustainably increase crop yields and livelihoods of smallholders.

To sum it all Prasanna suggested opportunities for;

- Breeding process improvement using novel tools/technologies for increasing genetic gains in stress-prone environments
- Reducing COGS, and enhancing affordability and accessibility of climate-resilient varieties
- Stronger public-private partnerships for systematic and accelerated varietal turnover
- Stimulation of demand for new varieties with improved genetics using innovative approaches

Advanta Seeds Africa on the other hand highlighted the challenges and opportunities in the vegetable seed business. The opportunities which include; consistent population growth,

Health awareness on nutrition, expanded preferences on indigenous vegetables and Local Production of vegetables. However, challenges facing the vegetable seed business as discussed by Advanta were numerous ranging from;

- Oversees breeding that doesn't resonate with Africa needs
- VAT inclusion on vegetables-Increases Input cost for SHF
- Counterfeiting-Impacts on production
- Seed handling-Storage conditions at channel level that impacts on viability
- Pest and Diseases-shortening product life cycle
- Predictability-forecasting is difficult due to scanty market information.
- Lack of adequate research/trial/segmentation information that leave farmers vulnerable
- Fluctuation and unassured market prices farm produce-No assurance of return business
- Dependency on imported seeds
- Too much too little-There is an upsurge of vegetable seed companies
- Inadequate local research on vegetables

and data.

KEPHIS' representative Simon Maina talked on 'Authorization as a Catalyst to Seed Production in Kenya.' Emphasis was put on Requirements for self-regulation, legal framework, authorization guidelines, eligibility, requirements for authorization as well as benefits of authorization.

Mulemia Maina, of Agri Experience outlined seed standards. "Standard Seed means seed that has met the minimum laboratory and post control standards for categories of crop as set by KEPHIS and is a progeny of certified 2nd generation or certified Standard Seed or by declaration by the Cabinet Secretary," he said. Mulemia pointed out Challenges and lessons which included;

- Difficulty in registration of Standard Seed vegetatively propagated crops on KEPHIS certification MIS.
- Single inspection that requires seed growers to be very knowledgeable in seed certification processes and requirements e.g. timely crop registration, rouging etc.

- Drought challenge –need for irrigation options for seed crops
- Outgrowers’ limited seed-production knowledge (many practices geared to maize production) requiring intensive training
- Small scattered land sizes among seed outgrowers making inspection difficult and expensive
- Low seed productivity: Lack of extension services and financial constraints leading to low use of required agro inputs (fertilizers and chemicals)
- Unrealistic expectation that seed price will automatically be lower –this will depend on forces of supply and demand
- He went on to state opportunities despite challenges saying that;
- Potentially lower costs in the long run if seed volumes increase considerably, especially if using authorized private

- Possibility of adding new crops which fit into selection criteria and are important for food or feed security.
- Outgrowers can become seed producing entities, increasing number of seed companies focusing on non-maize crops.
- KEPHIS is very supportive of standard seed because they recognize the challenge of seed availability of the focus crops.

Prof. Richard O. Oduor Ag. Registrar Research Innovation & Outreach Kenyatta University & Chairman KUBICO discussed ‘Biotechnology as an option for increased seed production: What’s next after lifting the GMO ban?’ He said crops targeted for Genetic Engineering included, Maize, Sweet potato, Cassava, Groundnuts, Sorghum,

Benefits for seed treatment as;

- Reducing the rate of pesticide use since it is applied to a smaller surface area (on the seed alone).
 - Timely intervention of key pests and diseases before critical damage stage
 - Ability to be integrated to IPM effectively
 - Time and energy saving for pest management.
 - Preserving seed quality and genetic potential
- Kimunguyi mentioned several seed treatment methods such as Seed dressing, Seed coating, Pills, encrusting and Seed pelleting.
- Crop nuts addressed ‘Building Resilient Food Systems for smallholder farmers in Africa’ putting emphasis on building a Food Secure Africa, Balancing soil and



inspectors

- Renewed interest among donors and financial institutions to invest in non-maize crops
- Can be sold locally and also exported

Rice, Tomato and Pegin peas.

AAK’s Eric Kimunguyi addressed seed treatment: ‘securing livelihoods and sustainable production’ pointing out the

fertilizer management for increasing yields.

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The topic ‘Genome Editing: Challenges and Opportunities,’ was well tackled by Kevin Pixley, Deputy Director General –Breeding & Genetics, CGIAR. He went on to note Genome Editing and its Possible Risk as follows; Non-target edits (additional to target), Genome editing avoids natural barriers to reproduction, inadequate stewardship by researchers, inequity between small and large farmers, Lack of transparency, ambiguity about intellectual property rights and insufficient institutional capacity in the public sector to fully avail genome editing technology.

In his presentation, Innocent Namuhoranye- Chairman, NSAR, vividly spoke about the status of seed business in Rwanda and their engagement with

farmers.

Dr. Esther Kimani OGW, CEO Pest Control Products Board (PCPB), highlighted the Technological Innovation and environmental sustainability, stating PCPB’s mandate and the guiding principles as well as product registration regulation. She also touched on the advantages of Seed treatment.

Society of Crop Agribusiness Advisors of Kenya (SOCAA’s) Lydia Kimani, had a thought inducing presentation on Development of indigenous seed systems for resilience building and improved productivity in Agriculture. “Food sovereignty is tied to seed sovereignty; they go hand in hand. People cannot feed themselves without seed freedom; and the seed policy environment should not constrain them.” The impact of the Formal Seed system to Indigenous Seed System as Lydia said was; Poor development of the Indigenous/informal seed system, Chronic food insecurity=net food importer, Use of low quality Inputs In production, Low investment in research and development=low adoption of improved varieties, missed opportunity to diversify incomes of farmers e.g through royalties

and weak-research extension-farmer linkages from the implementation of the SA PS= limited adoption of improved varieties

During the congress, seed companies blamed the influx of vegetables from Tanzania on the cheap cost of production in the neighbouring country as it does not charge the 16 per cent duty on tomatoes and onion seeds, having a negative impact on the Sh15 billion industry. Seed Trade Association of Kenya (STAK) said the VAT levied on vegetable seeds locally has made Kenya’s produce uncompetitive in the market. Mr Kiruaye, STAK chairman went onto say that the cost of producing vegetables in the country is 40 per cent high and this has a negative impact on the price of the commodity at the market.

Farmers were also educated on planting disease-free seeds as this would help cut down costs associated with disease management, and lower pesticides and/or insecticides use which would in turn save on farmers’ pockets, promote food safety and improve nutrition outcomes.

PS Livestock Development Harry Kimtai presided over the closing ceremony of the

2022 STAK Annual Congress, Expo and Mazao Forum. He noted that the Ministry has embarked on reviewing the National Seed Policy of 2010 and the development of National Seed Strategy and Investment Plan for Kenya which would provide a road map to guide in planning for the future. He also urged all stakeholders to re-dedicate their efforts and contribution in building the agriculture sector in Kenya.



Cereal entrepreneur shares tips on running a successful business



Anthony Wambua, the Chief Operations Officer at Kingdom Grains Company Limited.

Early this year, Anthony Wambua, saw a gap in the cereals market. Millions of Kenyans grow crops on a small scale but lack proper markets for their harvests.

Wambua founded Kingdom Grains Company, which does bulk-sourcing of maize, soybeans, chia seeds, red sorghum and beans among others.

He gets produce from small-scale growers and traders in Kenya, Uganda and Tanzania, then sells them to millers and other bulk purchasers.

“We cover about 17 value chains right from the farm gate and delivering to buyers,” he says.

Mr Wambua worked in Uganda in 2008 and would travel to Rwanda and Tanzania, a job that enabled him to spot a market need in agribusiness.

“When I came back, I worked for Cargill, an American global food corporation with offices in Kenya, and in as much I had experience in agribusiness, Cargill was a big eye opener for me because of the exposure I got to know the gaps in grains supply chain, more so on quality issues,” he says.

It is at Cargill that he saw farmers with the capacity to produce but had little knowledge of post-harvest handling and how to minimise losses.

Kingdom Grains has two categories of buyers – those looking for legumes, maize, and red sorghum for human consumption, and another group that purchases cotton seed cake, sunflower seed cake and rice germ to produce animal feeds.

A majority of the buyers are millers, food processors and wholesalers who bulk-source.

“One of the key concerns is the issue of aflatoxin, which is a post-harvest issue, so we work alongside suppliers on post-harvest handling where we can because when you compromise on quality from the source, the whole value chain is compromised,” he says.

Mastering the trade takes time and it has come with lessons. Mr Wambua says he has had to turn to imports amid a cutthroat business environment locally.

“We are being forced to import maize from Uganda, which attracts taxes because of the high cost of fertiliser in Kenya that makes production costs go up. Kenya is also a highly competitive business environment. The market is vibrant with many millers thus the cost of buying raw materials goes higher,” he says.

Mr Wambua says the main headache in a logistics business is that you can get the right source of grain at the right prices but face challenges of collecting and delivering it.

One needs to have a very efficient supply chain so you need to always have intelligence on the ground and a network that gives you accurate information continuously.

The other challenge is market dynamics. For example, before the General Election in August, the soybean demand in Kenya was high because about 80 per cent of the produce comes from Uganda with smaller quantities from Malawi and Zambia.

“The buyers, who are food processors, started getting jittery and stocked their warehouses with soybeans from Malawi and Zambia,” he says.

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By the time Ugandan farmers started harvesting their soybeans, Kenyan buyers had stocked the produce.

“The grain industry market is very dynamic. It can be very fluid. You can do your projections but something happens, people start panic-buying and when harvest comes in, prices drop,” he says.

He says the market is very competitive as both growers and millers through their respective lobby groups are fighting for the best grain prices for their members.

Import on their behalf

Despite being a young company, Kingdom Grains does about 1,000 tonnes per week. “We are growing. We are talking to Nakuru Business Association and some of their members would want us to do about 300 metric tonnes a week,” he says.

An accountant, by profession, Mr Wambua says two millers have also requested them to import on their behalf 3,000 metric tonnes of maize and even though the company is not able to do that right now, they are thinking of collaborating with companies.

One strategy that has sustained the business is contacting the farmer well in advance before

they harvest.

“We create relationships with the farmers. People appreciate when you walk with them, from when they start growing as opposed to showing up when it’s harvest time. We somewhat involve farmers, in the whole process,” he says.

His plans to sustain the business?

“On post-harvest handling, we invested in things like tarpaulins for drying the grains, which people take for granted. We have a network of farmers in Kenya, and Uganda, and we’re entering Tanzania. We want to start teaching them post-harvest management and how to use moisture meters and invest in rapid aflatoxin testing kits, just to make the business sustainable.

“The second thing is being competitive in terms of pricing – we update our price list every time meaning having market intelligence and getting information from our sources,” he says.

To survive the stiff competition, Mr Wambua says Kingdom Grains is setting its eyes on the smaller buyers.

“These are people buying approximately 500 kilos of grain so we are trying to map out this market and be very specific in catering to their

needs.

“This is where quality and food safety comes in because you are selling to restaurants and want assurance that what you are giving them is safe,” he says.

25 workers in EAC

He has built Kingdom Grains Company to about 25 workers, currently, with a presence in East Africa.

The well-travelled agribusiness entrepreneur says the company plans to launch an e-commerce platform.

“This makes all the difference because as an entrepreneur you are available.

Availability and effective communication are key in the market,” he says.

For those willing to venture into the grain value chain, Mr Wambua advises that the first thing is to get information and learn as much as you could about the different grain value chains from sourcing, standards, harvest periods, supply chain components of transport, and logistics and all the dynamics involved at all levels and what it takes to aggregate grain from point A and transport it to point B and lastly the market.

“There’s no shortcut but to start on a small scale with smaller volumes and grow. And even as you start, it’s going to be a learning curve.

“Everything you do should be market driven and informed by the needs of the market,” he says.

He adds that one cannot talk about a growing grain-sourcing company without food safety because they are two sides to a coin.

“Anybody that wants to be in the grains value chain in Kenya, East Africa, and Africa has to tackle the issue of food safety and that has been our differentiating point even in these early days as a business,” he adds.

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for control of **Broad-leaved Weeds**
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Night Shade, Black Bind Weed, Mallow,
Pigweed & Yellow Daisy in **Wheat &
Barley**





The yellow dwarf diseases of cereals have now been divided into two groups:

- Barley yellow dwarf virus (BYDV)
- Cereal yellow dwarf virus (CYDV)

They are the most important virus diseases of cereals worldwide. They have a wide host range which includes wheat, barley, oats and over 150 grass species.

The virus is usually spread by aphids from infected grasses to crops. Wet seasons promote growth of host grasses and build-up of aphid vectors resulting in early crop infection, severe symptoms and yield losses. Yellow dwarf viruses (YDV) tend to be more serious in the high rainfall cropping but can as well occur in all cropping regions. The virus is best controlled by monitoring and spraying for aphids early in the season.

What to look for

Symptoms of barley yellow dwarf are highly variable and can be confused with those of wheat streak mosaic, nutrient deficiency, root and crown diseases, and environmental stress. Barley yellow dwarf is tentatively diagnosed from the presence of aphid vectors and the occurrence of yellowed, stunted plants grouped singly or in small patches among normal plants.

Leaf discoloration in shades of yellow, red or purple from the tip down and from the margin to midrib is typical. In wheat symptoms start to become obvious at about the jointing stage of growth. Barley yellow dwarf does not produce a distinct mosaic pattern as do wheat streak mosaic



Barley Yellow Dwarf Virus

or soil-borne mosaic. The pale yellowing of older leaf tips is typical. During cool temperatures the tips can sometimes become a reddish-purple. In years with high aphid activity the patches of BYDV-infected plants can become quite large in some fields.

Symptoms take at least 3 weeks to appear after infection. The symptoms first appear where aphids have landed. Flying aphids may infect individuals or groups of plants



Aphids on Barley

dotted throughout the crop. If the aphids colonize the crop rings or patches develop which increase in size with time. If crawling aphids move into the crop from adjoining pastures or crops then symptoms will appear along the fence line first.

YDV symptoms can be variable and can differ with host species, cultivar and time of infection. Sometimes, infection of cereals may occur without visible symptoms. However, distinct symptoms usually occur on cereals although many infected grasses are symptomless.

Barley

Symptoms include yellowing of the leaves, starting at the tip of the leaf and moving towards the base, resulting in brilliant yellow coloration of the leaves and interveinal chlorosis.

Early severe infections can lead to:

- stunting
- abortion of florets
- delayed maturity
- Shriveled grain.

Late infections do not result in severe stunting but young leaves may turn yellow.

Wheat

Symptoms vary between cultivars and leaf yellowing may be slight to severe with interveinal chlorosis. Early severe infections can result in:

- increased number of poorly developed tillers
- reddening of flag leaves
- delayed maturity
- shriveled grain
- Reduced yields.

Late infections may only cause slight yield loss and slightly shrivelled grain.

Disease cycle

The YDVs have a very wide host range in the grass family (Poaceae). They survive between cropping seasons in volunteer

cereals, annual and perennial pasture grasses and wild grasses. The virus and vectors can survive in small pockets of surviving grass even in the low rainfall areas. The aphid vectors of the viruses tend to build up in autumn and spring on the grasses, and then move into cereal crops where they often develop colonies. High rainfall areas have a greater buildup of the grasses, virus and vectors.

The viruses are not transmitted by any other insects and are not transmittable through seed, soil or sap. The aphids need to feed on an infected plant for at least 15 minutes followed by a latent period of 12 hours, before the virus will transmit to a healthy plant. Aphids remain infected for the rest of their life.

Management

Early sown crops or long season crops sown in high rainfall areas are particularly vulnerable to this disease. Where resistant varieties are not an option, the management of aphid activity in crops especially early in the season to prevent its spread and or delayed sowing to avoid the main aphid flights can reduce YDV infection.

Later sowing to avoid the main aphid flights will reduce the incidence of YDV but this needs to be weighed up against possible yield reduction from delayed sowing.

Genetic Resistance

An important strategy to manage BYDV is to plant resistant or tolerant cultivars. High levels of resistance or tolerance are not available in wheat; however, commercial cultivars vary in their susceptibility to barley yellow dwarf. A good strategy is to grow diverse varieties to minimize the potential that a single variety will be severely affected by the disease

Cultural Practices

Cultural methods of managing barley yellow dwarf include controlling grassy weeds, including volunteer cereals, within and near wheat production fields. These practices will minimize the virus and vector reservoirs in wheat growing areas.

Chemical/Biological Control

Fungicides have no effect on barley yellow dwarf and should not be applied to control the disease. Seed treatments of imidacloprid or thiamethoxam can reduce aphid populations through the fall and, therefore, reduce primary infections.

However, insecticide seed treatments to control aphids may not be economical because of the sporadic nature of aphid infestations. Foliar insecticide control of aphids in the fall can reduce the incidence of barley yellow infections, but may not be economical if aphids escape the treatments or migrate in from untreated areas.

Delayed sowing

Late sowing to avoid the main aphid flights will reduce the incidence of YDV but this needs to be weighed up against possible yield reduction from delayed sowing.



Why Farmers Need To Apply Liquid Foliar Fertilizer

By William Ng'eno

-Too much rainfall leads to fertiliser leaching or surface run-off that washes away nutrients.



MR. William Ng'eno -the Kenya Country Manager of Yara East Africa.

Crops, just like human beings and indeed all animals, need a balanced diet to thrive. Yet this truism hasn't been appreciated by some farmers, leaving their soil poor and unable to sustain crops. They in turn don't get enough reward for their investment.

With the continued use of the traditional dry fertilisers, which often have one or two nutrients, the rest of the ingredients, so to speak, are expected to come from the good old soil that has sustained us for decades, even centuries.

This is expecting too much from the soil! And expectedly, the nutrients in the soil get depleted over time, which will be reflected in symptoms like yellowing, purplish leaves, poor flowering, poor fruiting and ultimately reduced yields.

On a positive note, however, there is a growing mass of Kenyan farmers who are applying [liquid spray] foliar fertilisers on their crops. These are farmers who are changing with the times and climates. As the world changes, so must we, if we are to keep pace with it.

Climate change has caused unpredictable weather patterns with some areas receiving more or reduced rains than before.

Excessive rains or not enough rain complicate the application of dry fertilisers to crops. Too much rainfall leads to fertiliser leaching or surface run-off that washes away nutrients.

On the other hand, with reduced rains or prolonged droughts, farmers are unable to use dry or ground-applied fertilisers since they need moisture to dissolve and be



taken up by plants.

Yet it is important to point out that foliar application is not a substitute for dry applied fertilisers, but a complement for optimal crop yields.

What fertiliser companies need to do, however, is to ensure the products are easy and convenient to use. They should also be effective and safe for the crop. This is achieved by ensuring the products are based on raw materials with low impurities. As in life so it is even with crops. What you give them is what you get from them. Farmers who have used these foliar feeds have had a head start in the race for more produce and greater farm incomes.

Yet knowing the right thing is hardly enough for it to serve you well. How you do it is equally important.

The following are the best practices for foliar application:

Sourcing of top-quality foliar (not necessarily the cheapest) is key to achieving optimal crop yields. Good-quality foliar requires one or two applications per season while poor quality ones require several applications over the crop season.

This exposes the often 'hidden added costs' of additional applications, reduced crop response and more expense in the long run. Always buy foliar from reputable

companies with a long history of fertiliser manufacture to benefit from technology, research and quality raw materials.

It is also good practice to carry out product compatibility tests when mixing foliar with other commonly used pesticides on a small-scale before embarking on broad acreage applications. For instance, at Yara, we have what we call Yara TankMix App. This App can help you get it right.

The other important point to note is timely application. Follow the manufacturer's recommendations, especially on crop type, stage of crop and rates to be applied. These are critical to get the best outcome. It is always good to do spray water volume

and equipment calibration for best results. With about 60 per cent of our arable soils being acidic, phosphorous and micronutrient availability is limited, hence, the need for high-phosphorous foliar more than ever to realise better crop start and yields.

Unto those that much has been given much is also expected, says the Good Book. If you give unto your crop by way of ground fertiliser and foliar feeds, it will give back to you in increased yield and greater profit.



Time to fix seed systems to tackle Africa's hunger crisis

By Dr Jane Ininda

With such increasingly unpredictable weather patterns, a result of the effects of climate change, and frequent pest and disease outbreaks, farmers must take any measures to enhance yields. This includes access to and planting quality seeds.

Seeds significantly influence the quality and quantity of farmers' output. The African Union Commission's Seed Sector in Africa: Status Report and Ten-year Action Plan (2020-30) indicates that good quality seeds can potentially increase overall productivity by nearly 40%.

Clearly, it is critical that efforts to put quality seeds in the hands of smallholder farmers, who represent 70% of Africa's agricultural production, are accelerated. A key measure to support this is the formalisation of seed systems being rolled out in many African countries by instituting legislation.

But there is still a long way to go. Informal seed systems still account for up to 85% of the seeds that are planted on the continent. In the majority of cases, farmers store a portion of seeds from their own harvests for the next planting season and sometimes trade with their neighbours. These practices expose farmers to admixtures of all sorts of seed, whose yield potential is compromised by exposure to pests and diseases, while farmers miss out on the benefits of improved seed. Despite these risks, using informal sourcing channels remains an attractive option for farmers, as the most affordable, easily accessible, and available route.

The formalisation of seed systems aims to ensure that farmers only plant seeds sought from licensed seed producers that adhere to certain quality standards. Seeds must meet the characteristics of



the prescribed variety and be free of pests and diseases.

Only registered companies can be involved in the production, processing, packaging and distribution of seeds. This ensures that farmers have access to the right inputs and get value for their money. To illustrate this point, seeds of improved maize varieties could yield up to six metric tonnes a hectare, in comparison to 1.8 metric tonnes a hectare yielded by home-saved seeds.

Policy interventions must be aligned to support all actors, ensure seed research is funded, seed production and markets are transparent, and the right information is disseminated to the farmer. Quality assurance, national planning and coordination of legal and regulatory frameworks must also function to support this.

There will still be a place for informal distribution, which has been instrumental in sustaining farmers' seed requirements, allowing farmers to access seeds of varieties and crops that are not offered by large-scale distributors. Most seed companies in formal systems still focus mainly on maize, and very few on self-pollinating crops such as legumes, and small grains like millets, sorghum and rice. Even less for vegetatively propagated crops like cassava, potatoes, yams and bananas. Yet, informal seed systems often lack critical data on potential yields, pests or disease resistance, or even required climate and soil conditions for growth, making it difficult to plan.

About the Author:

Dr. Jane Ininda is the head of seed research and systems development at the Alliance for a Green Revolution in Africa.

Source: AGRA Digital

Originally posted on <https://mg.co.za/>



Plant health data is critical for effective policy change



Learning to evaluate wheat stem rust, a significant cause of crop loss, in the field in Kenya.
(Photo: Petr Kosina/CIMMYT)

in Africa, Asia, and Latin America to reduce crop losses due to pests and diseases, and improve food security and livelihoods for smallholder farmers.

Data-driven approaches

The Global Burden of Crop Loss project, which is run by the Centre for Agriculture and Bioscience International (CABI), is working to ensure that there is accurate data on the challenges posed by plant pests and diseases. Questions to understand include where crop losses are the highest, the causes behind these losses, and how best these they can be addressed.

Cambria Finegold, Global Director, Digital Development, CABI said, "If you are not measuring crop loss well, then you don't know if the extraordinary \$25.8 billion spent annually on agricultural research and development is working, or if we are spending it in the right ways."

Research by the Plant Health Initiative will play a significant role in collecting and disseminating data on some major pests and diseases, which can guide scientists on which areas to prioritize, thereby contributing to an impactful research agenda.

Once data is gathered, CABI aims to inform decision-making for actors at the top levels of the plant health system and ensure that appropriate action is taken to safeguard global food security with the limited resources available.

Establishing global networks

The value of a data-driven approach was

With rising demand for food, it is more critical than ever to address the challenge of crop losses due to pests and diseases. Current limited understanding of the extent of the problem prevents the advancement and implementation of plant health solutions. Global scientific collaboration is integral to ensure policy recommendations are well-informed by robust evidence and therefore more likely to succeed in the long-term.

The issue of global burden of crop loss closely correlates with the objectives of the One CGIAR Plant Health Initiative, which aims to prevent and manage major pest and disease outbreaks through the development and deployment of inclusive innovations and by building effective national, regional, and global networks. The Initiative, which is being led by the International Maize and Wheat Improvement Center (CIMMYT), will support low- and middle-income countries

"Experts gathered at the FAO Science and Innovation Forum to drive forward research partnerships to curb crop loss due to pests and diseases through efficient global sharing of data."

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emphasized at a session organized by the Global Burden of Crop Loss on October 14 exploring evidence-based systems to tackle food security. This session was a side event of the UN Food and Agriculture Organization (FAO) Science and Innovation Forum, which this year focused on highlighting the centrality of science, technology and innovations for agrifood systems transformation.

Prasanna Boddupalli, One CGIAR Plant Health Initiative Lead and Director of CIMMYT's Global Maize Program, explained how the Initiative will bridge knowledge gaps, build risk assessment and rapid response capability, improve integrated pest and disease management, design and deploy tools to prevent contamination of food chains, and promote gender-equitable and socially inclusive innovations for plant health.

With six devastating plant epidemics in Africa alone during the last decade and an increased number of climate change-induced droughts and floods, Boddupalli proposed a revitalized strategy using the objectives of the Plant Health Initiative.

Built on a foundation of partnerships, there are more than 80 national, regional, and international organizations involved in the Initiative across 40 countries in the Global South, in addition to the CGIAR research centers. Through this rapidly expanding collaboration, the focus will be

on establishing regional diagnostic and surveillance networks and implementing



Integrated pest management strategies have been key in dealing with fall armyworm in Africa and Asia. (Photo: B.M. Prasanna/CIMMYT)

Integrated Pest Management (IPM) and integrated mycotoxin management. To address the need for evidence-based policy recommendations, Boddupalli explained the purpose of the Plant Health Innovation Platforms in Africa, Asia and Latin America, leveraging the partners' research sites. Combining innovations from the CGIAR system, national partners and the private sector, these platforms will enable the co-creation and validation of pest and disease management packages, with the aim of significantly improving adoption of effective and affordable plant health innovations by smallholder farmers.

Removing the barriers for data sharing

The Plant Health Initiative team has recently collected and collated information from national partners and the private sector

on actions needed to remove constraints on sharing pest and disease surveillance data. Potential solutions include improved training of national partners, joint research projects, pre-defined processes for data sharing, and focusing on work that meets national and regional priorities.

These approaches will inform the sharing of data collected through the Initiative. For example, researchers are gathering surveillance data on 15 crop pests affecting seven different plants in 25 countries, with the expectation of collecting more than 44,000 samples from 2,100 sites in 2022

alone, with plans for sharing the results with partner institutions.

Boddupalli also emphasized the importance of ramping up remote sensing and drone usage, wherever feasible, for diagnostics and surveillance. However, the current gaps in accessing data and computing facilities in the Global South need to be addressed to make this a reality.

"The OneCGIAR Plant Health Initiative and the Global Burden of Crop Loss project have excellent complementarity," said Boddupalli. Both have an opportunity to generate and share robust data on crop loss due to existing and emerging crop pests and diseases and use this data to drive effective policy change on plant health management."



Digital solutions are boosting agriculture in Kenya, but it's time to scale up. Here's how

Digital agricultural services have proliferated across Africa over the last decade. Most are services that work on mobile phones, although more advanced technologies are in use too – like satellite images, sensors, blockchains and big data analytics.

The services offer access to information, markets and financial products.

Kenya is at the forefront of this development in Africa. The country is home to numerous service providers that seek to solve problems in food and agriculture using digital technologies. In 2020, the GSM Association counted 95 such services in Kenya. This is around twice the number found for instance in Nigeria, the country with the second highest digital agricultural services prevalence in Africa. Providers range from small start-ups to large companies that mainly offer advice, finance and market linkage.

But scaling up these solutions remains a challenge. A study on digital agriculture in sub-Saharan Africa showed that only a few service providers managed to register more than one million users. In Kenya, it's

estimated that only 20% to 30% of farmers use a digital agricultural solution. This is better than other countries in the region – but still low.

In our research, we examined how to support the scaling of digital agricultural services in Kenya. We found that uptake could be increased by building digital bridges in the form of digital platforms that bundle such services for easy access and use. But human bridges are also needed that link service users and providers.

The insights from the research can help service and platform providers design and scale solutions that suit different users. They can also inform policies and investments needed to create the conditions for scaling these services.

What we did

We conducted a survey of 758 likely users of hypothetical digital platforms that would aggregate digital agricultural services in Kenya. All the potential users had access to the internet or basic data connectivity.

Respondents were contacted via relevant Facebook groups and invited to complete the survey online.

A second in-person survey shed light on how agricultural intermediaries in Kenyan value chains use digital technologies in their work. These included 296 input dealers, output dealers and extension agents. Our research offers the first comprehensive study of the digital capabilities of agricultural intermediaries. More commonly, studies focus on agricultural producers.

What we found

Our research showed that likely users would see value in aggregator platforms if they made digital agricultural services easier to find and assured their quality.

They would also like platforms to be open to a wide range of value chain actors with diverse levels of digital skills. Our findings also highlighted that human interaction still matters. It should complement digitally

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ups developing digital solutions for a technology-savvy customer base of relatively well-educated users.

The widespread adoption of M-Pesa also played an important role. It facilitated the provision of digital agricultural services that require financial transactions.

The country needs to build on these successes. The digital transformation of Kenya's agriculture will become a reality if it can link viable digital solutions providers with potential beneficiaries. That requires digital bridges connecting diverse services and users. But it will also require human bridges to narrow the technological and skill gaps, to build trust in service provision and to reach those who are not yet connected.

Aggregator platforms that integrate agricultural intermediaries into their design are one avenue for building such bridges. This will happen if they understand the different demands and capacities of their users. The design and marketing of digital agricultural services will have to match users' needs and abilities. Similarly, public and private investments in skills, infrastructure and the business environment are crucial for such platforms to fulfil their potential.

Source: <https://theconversation.com/>

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enabled contacts and transactions.

Aggregator platforms can help scale up digital agricultural solutions in a number of ways:

Accessibility and usability: The platforms could make digital agricultural services easier to locate and use. This would help users navigate the often confusing array of services on offer. For instance, platforms could provide a one-stop shop for a diverse range of services that are easily searchable and only require a single registration and payment system. They would need to be usable with different types of digital technologies and skills.

Value enhancement and trust building: Aggregator platforms would be valuable if they could guarantee the quality and reliability of digital agricultural services. This would build trust in the services. They could do so, for instance, by setting, monitoring and enforcing quality standards for participating service providers or introducing user rating systems.

Human intermediaries could also play an important role in building trust.

Inclusivity: Users would like aggregator platforms to include a wide range of value chains and actors. Through their networks, intermediaries could get more actors to use aggregator platforms.

Of course, aggregator platforms don't offer

all the answers to scaling digital agricultural solutions. They would need a supportive policy environment. But there are gaps.

These include:

- Insufficient digital skills. This needs to be addressed by integrating related training at all levels of education.
- Poor technology infrastructure. This would require expanding access to high-speed mobile networks, affordable smartphones and reliable electricity, particularly in rural areas.

The way forward

Various factors have contributed to Kenya's leadership role in digital agriculture in Africa. Mobile network infrastructure expanded early on, supported by government policies which attracted the necessary investments and fostered competition. Digital business development was largely driven by dedicated individuals, innovation hubs and so-called angel investors. Together they created a conducive innovation environment for local start-



Prosaro at T2

For preventive and curative action against ear and leaf disease in Barley



PROSARÒ

- ✓ Zantara (T1)
- ✓ Prosaro (T2)

- Better grain quality and high yield
- Long lasting disease control



BARLEY SPRAY GUIDE

	Pre-plant	Seedling dev. (0, 7)	Tillering (9, 10, 13, 21, 25, 29, 30)	Stem elongation (31, 32, 37, 39)	Booting & Heading (49, 51, 59)	Flowering & Maturing (61, 69, 71, 92)
Seed Treatment	Roundup TURBO Seed and soil Borne fungal disease	Deter (2ml per kg of seed)				
Grass control	Annual grasses except bromegrass	Ralon (1lt per ha)			Can be tank mixed with Huskie	
Broad leaf weeds control		Huskie (1.0lt per ha)				
Diseases	Septoria & Rust predominant	Zantara (1.0-1.25 lt per ha)			PROSARÒ (0.75 lt per ha)	
Insect pests	Aphids, bollworms & others	Kunguza (0.3-0.6 lt per ha)			decis Fura (120ml per ha)	
Nutrients	Macro & micro nutrients deficiency	WUXAL Copper (1.0lt per ha)				
	Macro & micro nutrients deficiency	WUXAL Macromix (1.0lt per ha)				

NB: Scouting for insect is important. Spray when three to four larvae of bollworms are found per walking meter. Target the early instar stages of caterpillars.

For more information, please contact a Bayer representative near you

Narok: William Masikonde: 0715-407-493 • Nakuru: Martin Inungu: 0724355527 • Eldoret: Phyllis Koegek: 0724 355 848

Finding seeds and fertilisers at the right time can make the difference between a viable and failed harvest.

Agricultural supply chain platform iProcure secures these needs directly from major suppliers and distributes them to local agro-dealers in Kenya and Uganda.

But revolutionising traditional agricultural supply chains in Africa is no easy task. When Inc. Africa heard about this venture, we needed to know more, how it would work and in what way it would contribute to increasing crop production.

We approached Niraj Varia, the Novastar Ventures partner who recently added another title to his CV when he assumed his position as CEO of iProcure. Before asking our questions, we did a bit of desktop research to understand the magnitude of this crisis.

According to the British Red Cross, the continent was already in food crisis mode, with 146 million people going hungry. It attributes the disaster to rising food prices, conflict and climate change. The organisation describes it as the worst food crisis in four decades.

Dr Asha Mohammed, secretary general of the Kenya Red Cross, said, “We have been sounding the alarm for some time in Kenya. We are facing the worst drought in 40 years. Crop production has decreased by a staggering 70%.”

It was against this background that we asked Varia a few questions about the company, how it plans to solve the problem and what the future of it will look like under his leadership, in our Q&A.

What problems are iProcure solving?

We are directly addressing East Africa’s



Kenyan Startup Gets Proactive About the Food Crisis

iProcure has a plan to tackle the looming famine. It ensures farmers can access their agricultural needs when they need them.

low agricultural yield problems by ensuring that farmers can access critical agricultural inputs when needed.

As populations grow, urbanisation continues and consumers of all types demand more food products. The agricultural sector must improve its output to meet this demand.

We are building essential distribution infrastructure and technology systems, securing products directly from major suppliers and supplying these agricultural needs to local dealers in Kenya and Uganda.

The system saves farmers up to 25% in cost markup

and ensures the availability, quality and delivery of critical inputs such as fertilisers and seeds.

It lowers the cost of food production for smallholder commercial farmers and lessens the climate impact of agriculture in Kenya and Uganda. This ensures farmers can plant their crops on time and yield more crops using less land.

How did iProcure alleviate user hesitancy?

Uptake always starts slowly before the full value of the technology is realised. You need to establish tiny networks of early adopters before internal momentum can be generated and sustained.

These early users evangelised the technology product to their peers, which significantly supplemented our efforts to increase adoption. To address the initial uptake we:

1. Maximised value of the technology – ensuring it meets the user pain points, which were monitoring and controlling their

retail business.

2. Eliminated barriers to adoption – we established flexible payment options, including buy-now-pay-later and micropayments.
3. Ensured system stability with our representatives and customer service team.
4. Focused on training, not just technology, by including training in retail management of best store practices as part of our service offering.

What are its tech offerings for customers?

We have developed a fully integrated supply chain platform for rural Africa. It ensures transparency of inventory and transactions through the entire ecosystem – from manufacturing and warehousing to transport and retail.

A part of this is mobile Enterprise Resource Planning (ERP) for retailers. The agro-retailers use this to control their stock levels (allowing them to re-order before they stock out), track product expiry, and record transactions (allowing better control of the retailer’s operations). It also allows them to integrate into M-Pesa (to receive payment by mobile money).

The system also gives them profit and loss and balance sheet reports, stores farmer information – through an internal CRM – and enables shop owners to manage multiple stores at once. The software brings retailers from the pen-and-paper age to the modern digital world.

What financial benefits does iProcure offer?

Agriculture in Africa is almost exclusively rainfed. As a result, it is very seasonal. Farmers have to plant at the right time, apply nutrients at the right time and eliminate pests at the right time – or they lose their crop for the next four to 12 months.

This means that farmers in a region are buying seeds and fertiliser at the same

time, putting enormous pressure on the agri-retailer cash flows. They have to buy in large volumes before the season starts, but most do not have the cash reserves required to meet the farmers’ needs.

Their cash needs during the peak season are already three times their cash needs out of season, and this is before they even get going. We are providing inputs using Buy Now, Pay Later (BNPL) to those agricultural retailers so they can increase the amount of stock they hold for these peak periods.

How has the Russia-Ukraine war affected African food supplies?

Russia’s invasion of Ukraine was a huge wake-up call. We are dependent on food imports to feed our expanding population. Russia and Ukraine are two of the largest exporters of grain to the continent.

The war stopped exports. Global prices rose rapidly, and food price inflation has driven millions into food poverty. Beyond this direct impact, there is an enormous indirect impact as African countries have to import essential food, which puts an enormous strain on their forex reserves. There is a simple answer to this challenge: Africa must produce more of our food ourselves. This does not require magical solutions, as our agricultural yields are 10% of what they could be.

One specific and known reason why the continent is not achieving better yields is that it is not planting the right seeds, not

giving the crops the nutrition they need and not protecting them from pests. iProcure ensures that farmers have what they need when they need it.

What does the future of the company look like?

We have built an engine that delivers enormous value to agro-retailers and farmers, fuelled by our technology and data. We sell to about half of all agricultural retailers in Kenya and have doubled every year since 2017 (aside from the universally tricky year of 2020 due to the Covid pandemic).

The company is now ready to build on this by expanding its BNPL offering, deepening our presence across Kenya, expanding into Uganda this year and into Tanzania and Nigeria next, and growing our product offering along the way.

Finally, we have seen that our mobile ERP adds enormous value to retailers, regardless of what products they sell. We intend to make it available to all rural retailers and are already adapting the technology to serve these more diverse needs.

We have many paths to continued growth. I plan to ensure we keep growing our engine while, every year, adding one to two new revenue lines that could, on their own, add materially to the value of the business.



To Make Kenya's GMOs Journey



The bold decision by the government was largely informed by the severe drought, which has not only become frequent but has dampened the country's food security prospects.

The Kenya Kwanza government must be commended for taking the bulls by the horns in terms of seeking solutions to some of the challenges facing the agriculture sector. This is because the debate on GM crops has been on the cards for so long, but had largely been swept under the carpet

That said, the government through the Kenya Agricultural and Livestock Research Organisation has for over 10 years participated in the development of three genetically modified crops namely maize, cotton and cassava. This research should, therefore, not have been done in vain.

Lower cost of production

The Agriculture Sector Network, therefore, fully backs the decision by the government to adopt the growing of genetically modified crops. This is because of its potential to not only increase our food output but also lower

By Dr. Bimal Kantaria

Two major developments that have happened in the country in the past months will shape the agriculture sector moving forward.

First is the lengthy dry spell that has disrupted farming activities in various parts of the country, pushing millions to starvation, and second is the cabinet decision to lift the decade-long ban on farming and importation of genetically modified (GM) crops.



... a Success, State Needs Support



cost
of animal
feeds.

Just like cotton, GM cassava is resistant to drought and other tough climate conditions, thus its wide cultivation due to better variety would boost its production as a food crop and animal feed.

Lastly, Bt maize promises to make Kenya food secure as the cereal is our staple. Research shows that maize yields three to four tonnes per hectare, from the current average of 1.8 tonnes from the conventional type.

Kenya imports up to 10 million bags of maize annually to cover a deficit that arises after the country harvests some 40 million 90kg bags of the produce annually. With increased production, imports would not be necessary.

Bt maize is also resistant to stem borer and the fall armyworm – two of the most devastating cereal pests – and reduces chances of aflatoxin attack. Kenyan farmers spend billions of shillings trying to control these pests, pushing up production costs. The Bt maize, therefore, promises to put more money in farmers' pockets.

The government needs support in ensuring Kenya's GM story becomes a success. We need to increase awareness of the benefits of GM crops even as experts work to iron out concerns such as losing control of their own seed systems by farmers as well as the lack of local policies and laws to regulate the industry.

Mr Kantaria is the chairman, Agriculture Sector Network.

costs of
production
and put more
money in farmers'
pockets.

So how is the lifting of the ban likely to catapult the various agriculture sectors?

Let us start with manufacturing. The government two years ago adopted commercial farming of Bt cotton in a bid to revive the floundering textile and apparel sector.

One of the reasons the industry is on its knees is due to pests that include African bollworm, which used to attack the conventional cotton variety leading to lower production.

Bt cotton is resistant to pests and diseases like alternaria leaf spot, which means

increased
yields and
low cost of
production that will
enable our industries to
have plenty of raw material
to process. A hectare of well-
farmed Bt cotton yields an average of
1,000 kilos as compared to 300 kilos from
conventional variety.

With increased production, Kenya will be on track to lifting the manufacturing sector to contribute 15 per cent to the country's gross domestic product as per the country's target. Similarly, the livestock sector is expected to benefit from the growing of Bt cotton and GM cassava as the two can be used as animal feed ingredients.

Cotton seed cake is used as a protein ingredient; which Kenya currently imports. Growing our own would lower the cost of animal feeds that now remain out of reach for many farmers.

Maize reliance

Our reliance on maize has also been blamed for the high cost of animal feeds. Cutting dependence on the grain through the use of carbohydrate sources like GM cassava has the potential of reducing rising



Investing in Rural Women Farmers Narrows The Gender Gap In Agriculture

Authors:

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The glaring inequality between men and women farmers in the African agricultural sector is alarming evidence that calls for fair, inclusive and sustainable development. Gender productivity gaps vary across and even within countries, but recent studies suggest that gender gaps are in the range of 10% to 30%.

Gender gap in agricultural productivity means that crop production is lower than its potential. Closing the gender gap in access to production capitals alone has been estimated to have the potential of lifting 100–150 million people out of hunger, thus resulting in benefits that spread far beyond female farmers.

Gender issues in agriculture including access to and control over resources continues to be the underlining factor widening the gap in production between male and female farmers in Africa. Much of the work women do as household providers and agricultural producers is

unpaid, making their contribution essentially invisible. Women and female-headed households are disproportionately affected by economic recession and higher food prices and trade policies.

The crucial question becomes, how do women farmers involve in, equitably benefit from and contribute to agriculture development? We cannot overcome these challenges while age-old, ingrained ideas of gender roles deny women's full participation in decision-making and social and economic development. The stage of intentions, promises and pious hopes should be over; we must now not only act but must all act targeted to challenge and combat gender inequality. Investing in women farmers significantly increases productivity, reduces hunger and nutrition, and improves rural livelihoods for both women and men, and the next generation, partly because women spend their money and their produce differently and save their income by investing in areas such as health, education, social assistance, and

child nutrition.

The Persistence of Gender Inequality is the Reason why we should Challenge it

In order to understand why gender inequality, persist, we need to underscore what gender is. The word gender describes a social construct that ascribes roles, rules (norms), responsibilities, opportunities, power, behavior and what the society considers appropriate for men and women. Though fluid and context-specific, the construction of gender underlines the reason for the persistence of gender inequality experienced differently by men and women. Because gender construction is as old as the human race, so is gender inequality. We are all influenced by gender.

Gender norms (or rules) seem to influence what is appropriate to do in our society. Because of gender, girls and women often have lower social status, less access to resources that should naturally be given or used without applying the gender spectrum. These issues are at the core of



societies dominated by stereotypes, and norms. Limited opportunities for innovative technologies hamper rural women's livelihood prospects and personal development. Through a recent study in three sorghum, pearl millet and groundnut production regions in Mali, about 1000 women farmers, marketers, processors highlighted the most significant constraints and challenges that limit their agricultural productivity, among which access to improved seeds, market linkages, fertilizers are major constraints.

Gender-sensitive interventions that would create market linkages and increase access to inputs are some of the ways to ease the

the contemporary gender system, which systematically empowers one against the other, consequently producing a bidirectional relationship between gender inequality and development outcomes. While more women farmers in Africa continue to engage in farming, look for and adopt high yielding nutritious and climate-resilient crop varieties, they face an array of constraints making full involvement in and contribution to agriculture difficult. One of such is the lack or poor involvement of women farmers in technology development and transfer processes.

“Before women were not interested in growing sorghum but with the arrival of grinkan (improved variety), we started growing for selling to meet our needs. Women are becoming independent of men. The introduction of new varieties brought a change in the relationship between women and men because there are fewer quarrels due to money problems” (by a female sorghum producer in Sikkasou, Mali during FGD in 2019)

Customized interventions to target, reach and empower women cereal-legume value chain actors.

Women have far less access than men to input, financial services, land ownership, training and other means of increasing agricultural production and improving family income, nutrition and health. In West and Central Africa, women live in patriarchal

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gender inequalities requires inclusive and transformative approaches that include:

- targeting to ensure that nobody is left behind and no need is forgotten or neglected
- reaching the areas of interest and impactful
- customize interventions that equally benefit women actors of the agricultural value chain
- These actions require urgent interventions to act now by investing more resources and energy in the empowerment of women farmers to facilitate their access to productive resources and their capacity in agricultural innovations for a fairer, more equitable and more balanced world.

There is need to advocate for and alert the world on actions that can reduce gender inequality:

- Go beyond the production stage to support women in each key segment of the agricultural value chain.
- Identify entrepreneurial and paid off-farm options for women in each key node of the agricultural value chain.
- Provide a 'package' of support services such as credit, business development training, and transportation services for women farmers.
- Facilitate reducing women's drudgery and access to inputs, equipment and skills to help them take advantage of innovations, market, and development outcomes.

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economic and social burden on women, enable them to benefit from technological development. This is why customized training on behavior change and communication aimed to equip and to build the capacity of women involved in cereals-legumes value chains. Trainings focused on seed production, post-harvest techniques, processing and market linkages are the best way to reach, empower and to alleviate the structural and functional constraints faced by women. A total of 208 women from millet, sorghum and groundnut value chains participated in the trainings in Sikasso, Bougouni, Yanfolila, Koutiala, Kita and Diolila between 26 December 2020 and 06 January 2021.

Need to think about and apply adapted and contextualized responses

Empowering women and combating



Exploring the Potential for Blended Wheat Flours in Kenya

CIMMYT supports practical solutions to the ongoing global wheat crisis by understanding consumer acceptance of foods baked from blended wheat flour.

Over the years, wheat-based foods have increasingly been incorporated as part of Kenyan meals. One example is packaged bread, which has become a common feature on Kenyan breakfast tables with millions of loaves from industrial bakeries delivered to retail shops daily, countrywide. Another example is chapati (a round unleavened flat bread). Once reserved for special occasions, chapati can now be purchased from roadside vendors throughout the capital Nairobi.

Millers and processors in Kenya are highly dependent on imported wheat to meet the strong demand for wheat-based food products. The conflict between Russia and Ukraine, two of the most important sources of imported wheat for Kenya, presents a major threat to millers and industrial bakeries. Prices for bread and chapati are increasing and may continue to increase. Governments and wheat-related industries are looking at short- and long-term options to reduce utilization of imported wheat. One short-term option is the blending of wheat flour with flour derived from locally available crops, such as cassava, millet or sorghum.



WH BIN	TYPE	QUANTITY
29 1	ARGENTINE	30%
31 2	RUSSIAN	20%
30 3	LOCAL	10%
28 4	UKRAINE	40%

**Record-high price of wheat
A sign at a flour mill in East Africa shows proportions of wheat from different origins (Argentina, Russia, Ukraine and local) used in that particular day's production. (Photo: Alison Bentley/ CIMMYT)**

A visit to local industrial bakeries and wheat flour millers on the outskirts of Nairobi by International Maize and Wheat Improvement Center (CIMMYT) researchers confirmed the effects of record-high global prices of wheat. Global Wheat Program director Alison Bentley and senior economist Jason Donovan

had conversations with leaders of industrial bakeries and millers, who gave insights into their grain demands, production processes and sales volumes.

One of the leaders of an established industrial bakery divulged that they use approximately 15,000 tons of wheat flour monthly to make baked products, with only 10% of the wheat obtained locally.

"In the last ten years, local wheat production has comprised about ten to fifteen percent of our cereal mixture for



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bread, and we were already paying higher prices to farmers compared to import prices. The farmers were already being paid about 30 to 40 dollars more per ton," a manager of a large baking industry in Kenya explained to the CIMMYT team.

According to government regulations, millers and bakeries must purchase locally produced wheat at agreed prices before they can buy imported wheat. He agreed that though the quality of local wheat is good, the local production cannot compete with the higher volume of imported wheat or its lower price.

Growing wheat in East Africa

It has been more than four months since the Russia-Ukraine conflict unfolded, prices of wheat-based products have been increasing significantly. The current crisis has sparked the debate on low levels of self-sufficiency in food production for many countries. And this is especially the case for wheat in Kenya, and more widely in Africa.

Bentley points out that the biophysical conditions to produce wheat in East Africa are present and favorable. However, more work is needed to strengthen local wheat production, starting with efficient seed systems. Farmers who are interested in growing wheat need access to high performing and stress-tolerant wheat varieties.

CIMMYT Global Wheat Program director, Alison Bentley, observes the bread making process at an industrial bakery on the outskirts of Nairobi, Kenya. (Photo: Susan Otieno/CIMMYT)

Practical response to the crisis

With no certainty as to how long the conflict will continue and climate change resulting in significant crop loss in key production zones, wheat shortages on international markets could become a reality. Blending of wheat flour with locally available crops

could be an option as an immediate response to the current scarcity of wheat in East Africa. "Blending [flour] is when for instance five percent of wheat flour is replaced with flour from a different crop such as sorghum or cassava," Bentley explained.

Donovan added that, though it might seem like a small number, it becomes significant in consideration to the volume of wheat that industries use to make different products, translating into thousands of metric tons. He noted that blending flour therefore has the potential to create a win-win situation, because it can boost the demand for local crops and address uncertainty and price volatility on international wheat markets.

Consumer acceptance of new products

During a full week of engagements with

would have higher nutritional benefits or lower prices. "This reinforces the need to understand consumer preferences and evaluate both the functionality of the flour to produce essential food products such as chapati or bread as well as the taste of those products," Pieter Rutsaert explained.

CIMMYT researchers Sarah Kariuki and Pieter Rutsaert, both Markets and Value Chain Specialists, and Maria Itria Ibba, Head of the Wheat Quality Lab, are therefore engaging with local millers and universities in Kenya to design bread and chapati products derived from different wheat blends, to include blends comprised of 5%, 15% and 20% of cassava or sorghum. Lab testing and preliminary consumer testing will be used to identify the most promising products. These products will be taken to the streets in

urban and peri-urban Nairobi to assess consumer tastes and preferences, through sensory analysis and at-home testing.

The market intelligence gained will offer foundational support for CGIAR's Seed Equal Initiative to accelerate the growth of a demand-driven seed system. By gathering and analyzing consumer preferences on selected crops for blending, such as from farmers and milling industries, Donovan pointed out that CGIAR breeding will

continue to make informed choices and prioritize breeding for specific crops, that seek to address specific challenges, therefore having greater impact.

Donovan noted that data and information from the studies will provide much needed evidence and fill information gaps that will support governments, millers, processors and farmers to make decisions in response to the evolving wheat crisis.



Different types of flour on supermarket shelves in Kenya. (Photo: Pieter Rutsaert/CIMMYT)

universities, partners, and industry experts in Kenya, the CIMMYT team explored the current interest of the sector in blending wheat flour. Several partners agreed that this could be a potential way forward for the grain industry but all highlighted one key element: the importance of consumer acceptance. If the functionality of the flour or taste would be negatively influenced by blending wheat flour, it would represent a no-go from the industry, even if blends



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How to tackle soil-borne diseases

By Shabibah Nakirigya

What you need to know:

- Adequate crop nutrition makes plants more tolerant of, or resistant to, diseases. Also, the nutrient status of the soil and the use of particular fertilisers and amendments can have a significant impact on the pathogen's environment.

You have done everything possible, including using enough fertiliser, top dressing, foliar feed, herbicides, fungicides and all, and even ensured your plants are well watered, but they do not seem to be growing right. Even before they have lasted a month or two in the ground they start turning yellow, have rotting roots and stunted growth.

Despite the effort and money you have spent on your crop, you just watch it die because you do not know what to do. However, there yet might be something you may not have considered — that the problem might be in the soil. It could be infested with diseases caused by fungal pathogens and that is what you need to treat.

Soil organisms

Soil-borne diseases occur due to a reduction in the biodiversity of soil organisms. They are harder to detect and test for than leaf-causing infection.

They often have similar symptoms to drought and nutrient deficiencies, which may be operating at the same time and can greatly reduce yield and quality. They cause diseases of the roots or stems and disrupt uptake of water and nutrients from the soil. This may lead to reduced yield, wilting, yellowing, leaf fall, stunting and plant death. Using field pesticides or fungicides may not be effective.

Fungal pathogens live in the soil and in residues on the surface and can build up slowly, with some surviving for more than 20 years, even without susceptible crops.



Causes

The majority of these pathogens affect many crops and may cause different types of diseases on different crops. For example, *Fusarium oxysporum* affects a wide variety of crops of any age. Tomatoes, tobacco, legumes, cucurbits, sweet potatoes and bananas are some of the most susceptible plants. A particular species may cause severe root rot on one crop but only cause superficial and symptomless infection on another.

However, some pathogens have a very narrow host range. For example, *Fusarium oxysporum f.sp. lycopersici* only affects tomatoes. The question would then be how one can destroy and protect their soils from these pathogens?

As a smart farmer who wants to get the most from what you have, choose an effective and economical disease management option. It should be simple, safe, and adequate to reduce the diseases



considerably. Soil-borne diseases occur due to a reduction in the biodiversity of soil organisms.

Factors

When choosing your method of control, assessment of disease incidence, disease severity, and potential crop loss are key factors. Timing is also critical to hit the pathogen before it causes irreversible damage to crops. Few management options possess all the above qualities and so a mix of them is advisable.

They include biological control, cultural methods and chemical intervention. Let the good ones to eat the bad (Biological control). This will involve adding beneficial soil organisms and the food they need to the soil to increase their numbers and type.

These organisms would help stabilise the soil's biological system and suppress diseases through competition, antagonism, and direct feeding on pathogenic fungi, bacteria and nematodes. There are a number of commercial products containing beneficial, disease-suppressive organisms. These products are applied in various ways, including seed treatments, soil and

compost inoculants and soil drenches.

Among the beneficial organisms available are *trichoderma*, *mycorrhiza*, *flavobacterium*, *streptomyces*, *gliocladium spp.*, *bacillus spp.*, *pseudomonas spp.*



conditions. Growers using the product have reported amazing benefits.

They include vigorous and healthy crops resistant to soil-borne and secondary diseases, an increase in yields of a higher quality and a healthy return on investment. It is also versatile and grows fast and

Using beneficial fungus *trichoderma harzianum*, the fungus works in different ways to choke growth of harmful fungi like *fusarium*, *pythium*, *rhizoctonia* and *sclerotinia*. The first is competition.

effectively on the roots of all plants. This means it can be used in vegetables, flowers, fruit crops, field crops, lawns and forestry among others.

Cultural methods

This involves making the environment the pathogens live less comfortable through crop rotation, plant nutrition and compost amendments.

Crop rotation

Many diseases build up in the soil when the same crop is grown year after year. Break the cycle through rotation to a non-susceptible crop, which will also reduce pathogen levels. Carefully plan the rotation for success. Since diseases attack plants related to each other, group the crops

It grows faster than the pathogenic fungi, competing for space and nutrients, leading to starvation, which causes death for microorganisms. It also behaves like a mycoparasite growing around pathogens and producing enzymes that break down their cell walls.

Thirdly, the fungus helps to stimulate vigorous growth of the root system and improves the uptake of water and nutrients. This results in a stronger, more uniform crop, which gives better yields even under difficult



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within families or species.

The susceptible crop, related plants, and alternate host plants for the disease must be kept out of the field during the rotation. Since pathogens persist in the soil for different lengths of time, the length of the rotation should be varied with the disease. However, crop rotation will not help control diseases that are wind-blown or insect-vectored from outside the area or pathogens that can survive long periods in the soil without a host.

The role of plant nutrition in disease control
Soil pH, calcium level, nitrogen form and nutrients can help in disease management. Adequate crop nutrition makes plants more tolerant of, or resistant to, diseases. Also, the nutrient status of the soil and the use of particular fertilisers and amendments can have a significant impact on the pathogen's environment.

For example, nitrate forms of nitrogen fertiliser may suppress fusarium wilt of tomato, while the ammonia form increases disease severity.



Compost

Compost has been used effectively in the nursery industry, in high-value crops, and in potting soil mixtures for control of root rot diseases. A diversity of bacteria, fungi, protozoa and beneficial nematodes exists in good compost.

Adding mature compost to soil induces disease resistance in many plants. The larger biomass of active microorganisms the greater the soil's capacity to use carbon, nutrients, and energy, which lowers their availability to pathogens.

Other cultural control methods include use of disease-free transplants or seeds, planting of resistant varieties soil solarisation treatments, crop sanitation involving destruction and or disposal of plant residues to reduce the disease agent's ability to reproduce or over season in crop debris. Proper weed control is another.

Weeds

Weeds may serve as hosts for many diseases. Pre-plant fumigants, for example, metham sodium, are often successful in reducing soil borne inoculum, though their use may be expensive and regulated.

Fungicide-treated seed is an important tool against certain seed and seedling diseases. In some situations, a fungicide applied to the soil or to plants can be an effective disease management tool. For most soil-borne pathogens, however, field-applied fungicides are usually not very effective.

Plan carefully

Break the cycle through rotation to a non-susceptible crop, which will also reduce pathogen levels. Carefully plan the rotation for success. Since diseases attack plants related to each other, group the crops within families or species.

Source: <https://www.monitor.co.uk/>



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Regenerative Agriculture: Is It Making Any Sense To Farmers?

The population of the world is taking a storm. The food suppliers of the world, a.k.a. farmers are acquiring all the methods needed to solve the shortage of food supply and related resources to keep the population lively. Below is a report from Statista that tells about the resources being used in the countries. It also tells the importance of regenerative agriculture that will drive the



future feeding of the growing population. The stats below are descriptive enough to reveal facts and consider regenerative agriculture as the only form of agriculture.

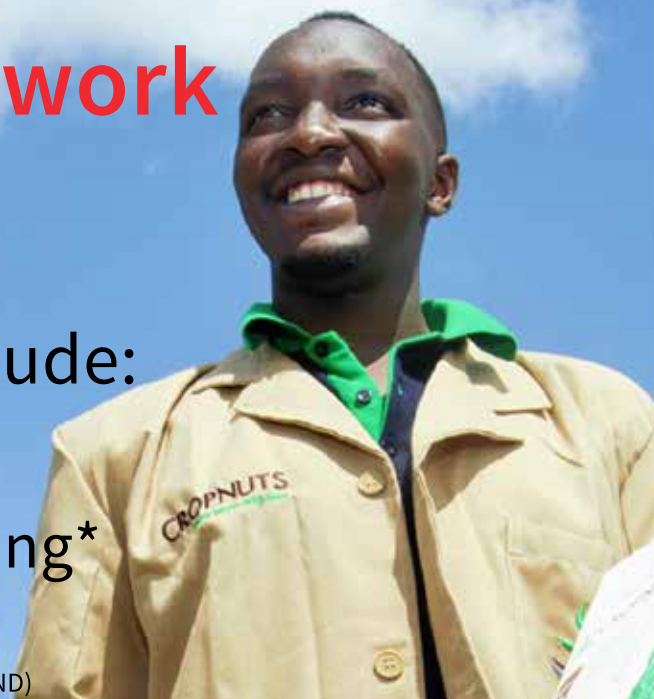
The plan here is to feed the world. In the coming future, with the growing population, 4 billion acres of cultivated farmland, 8 billion acres of pastureland, and 10 billion acres of forest land won't be able to feed the planet. Thus regenerative agriculture is the only option left with our planet. So, let's dive into the concept.

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What is Regenerative Agriculture?:

A brief Regenerative agriculture is the need of the era. Regenerative agriculture is the practice of fertility regeneration of soil through organic practices without ruining the naturality of soil. It works on a simple principle, "Treat soil better and the soil will revert the same". Its final aim is to restore carbon from the atmosphere to the soil. Regenerative agriculture is not just the restoration of carbon, but it's also the restoration of micro-organisms, growth of cells, nitrogen-fixing plants, etc., to the soil if it's lost the desire of your farmland. It takes a lot to find cultivating soil that can yield crops, maintain biodiversity, and withstand the worst of natural crises. Furthermore, with organic practices, it is simple to restore soil health.

In addition to the above fact, regenerative agriculture is also about increasing the efficiency of soil without cutting down

forests. It also involves waste land or land without usage. The idea here is to increase the farming capacity of the earth to become future-ready.

Some Types or Techniques of Regenerative Agriculture

As we have already discussed, regenerative agriculture is not just about increasing forest area to infuse carbon into the atmosphere into the soil. But, it's also about making the soil last longer in terms of fertility, usability, and withstanding the worst of the earth's atmosphere. Let us hereby discuss the types in detail.

1. No-Till and pasture cropping

This type of regenerative farming/agriculture says, "disturb no soil". In this type of farming, special drillers are used to seed the cultivation plants. And, the grass here is left for grazing to animals or livestock. This helps in preventing soil erosion as well.

2. Annual Organic Cropping

Organic cropping, as we all know, is the use of organic means for crop cultivation. This type of farming is less expensive, more time-consuming and requires an equivalent amount of labouring efforts. But, people practice the inorganic method more because of its availability. However, this type of farming is becoming more and more trending due to consciousness among people.

3. Compost tea and compost

Compost tea increases soil fertility and improves micro-organic growth in the soil. Hence, obtaining the primary goal of regenerative agriculture. The optimal concentration of organic matter in the topsoil (almost 6 inches of it) should be 3-5%. And, hence the name.

4. Biochar and Terra Preta

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In this type of regenerative agriculture, we use black carbon as the source for maintaining soil health and microbial biodiversity. Black carbon is very effective in increasing soil fertility. Research shows that black carbon can increase the fertility of the soil by more than 70 times.

5. Perennial cropping

This type of regenerative agriculture deals with potential soil erosion areas by not weeding out the soil. This saves farming costs and reduces tilling operations. The strong roots of grasses save the soil from erosion during worse economic conditions.

6. Ecological Aquaculture

In this regenerative farming, the aquatic life is protected and inhabited by nurturing them with trees and organic matter. This promotes healthy aquatic life in and around farmlands. Thus, a sustainable food chain is maintained.

Regenerative Farming Benefits: Why is it worth it?

We discussed the current situation on earth in the introduction part. And, henceforth, we very well understand that regenerative

agriculture is the need of the era. Although the production and profits due to this regenerative farming are very low as compared to industrial and mechanized farming efforts. However, people are getting more and more conscious about a sustainable future and the depleting quality of the soil.

Regenerative agriculture has not only brought sustainability but also paved the way for cleaner and greener earth with less carbonic emissions. In this discussion, let us ponder about some specific points of why is it of utmost importance:

1. Support Global Food Needs

The earth's population is continuously growing. And hence the demand for food and related resources has also increased. Surveys show that smaller-scale farms are more than large-scale farms. So, small-scale farms supply most of the food in the world.

2. Eliminate GreenHouse Emissions

Regenerative agriculture might seem a little bit of a conventional term. As it helps restore the environment and avoid carbon emissions from the surface to the earth's atmosphere.

3. Tackle Droughts

Regenerative agriculture is tackling droughts by restoring soil moisture, microbial life and carbon. It improves water retention and filtration.

4. Regenerate Grasslands

70% of Earth's grassland has vanished due to modern agriculture techniques. Thus regenerative farming helps restore the earth's carbon absorbers into its soil.

5. Raise the Nutritional Value of Crops

More is the biodiversity of the soil, the more its nutritional value. Hence, regenerative farming is necessary.

6. Helps Local Farming Communities

It helps local farming communities by helping them with employment opportunities.

The Difference Between Regenerative Agriculture and Organic Farming

S.No.	Regenerative agriculture	Organic Farming
1.	It is the practice of restoring soil health and the ecosystem around it.	This branch of farming only helps you restore the soil.
2.	It solves almost every food problem the earth is facing or going to face in the future.	It solves only the problem of soil degradation.

The Final words

Reading this, you might have understood that you fulfil the food needs of the earth's growing population; we need to adopt regenerative agriculture techniques. Also, we should make people aware of the cause and make it available to the common domain



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